

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
24 March 2005 (24.03.2005)

PCT

(10) International Publication Number
WO 2005/027215 A2

(51) International Patent Classification⁷: **H01L 21/318**,
C25D 9/04, 11/32, 11/26, 11/02, 11/04, 11/34

(21) International Application Number:
PCT/EP2004/009512

(22) International Filing Date: 26 August 2004 (26.08.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
103 43 692.8 18 September 2003 (18.09.2003) DE

(71) Applicant (for all designated States except US): **MATT-
SON THERMAL PRODUCTS GMBH** [DE/DE]; Daim-
lerstrasse 10, 89160 Dornstadt (DE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **NENYEI, Zsolt**
[DE/DE]; Sperberweg 4, 89134 Blaustein (DE). **CHUNG,
Hin, Yiu** [DE/DE]; Stiergartenweg 6, 89275 Elchingen
(DE).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,
SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: A PROCESS FOR THE PRODUCTION OF A NITROGENOUS LAYER ON A SEMICONDUCTOR OR METAL
SURFACE

(57) Abstract: A first process for the production of a thin nitrogenous layer on a semiconductor surface by contacting at least a part
of the surface with a nitrogenous liquid, by applying an electrical voltage between the surface, the liquid and an electrode according
to a given voltage-time curve until a layer thickness of less than 5 nm is formed, and then separating the surface from the liquid.
A second process for the production of a thin nitrogenous layer on a metal surface or on a metal layer located on a substrate by
contacting at least a part of the surface or the metal layer with a nitrogenous liquid, by applying an electrical voltage between the
surface or metal layer, the liquid and an electrode according to a given voltage-time curve until a layer thickness of less than 50 nm
is formed, and then separating the surface or the metal layer from the liquid. A third process for detaching an oxygen-containing
and/or nitrogenous layer on a semiconductor or a metal surface.



WO 2005/027215 A2

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
24 March 2005 (24.03.2005)

PCT

(10) International Publication Number
WO 2005/027215 A3

(51) International Patent Classification⁷: **H01L 21/318**,
C25D 9/04, 11/32, 11/26, 11/34

(21) International Application Number:
PCT/EP2004/009512

(22) International Filing Date: 26 August 2004 (26.08.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
103 43 692.8 18 September 2003 (18.09.2003) DE

(71) Applicant (for all designated States except US): **MATT-
SON THERMAL PRODUCTS GMBH** [DE/DE]; Daim-
lerstrasse 10, 89160 Dornstadt (DE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **NENYEI, Zsolt**
[DE/DE]; Sperberweg 4, 89134 Blaustein (DE). **CHUNG,
Hin, Yiu** [DE/DE]; Stiergartenweg 6, 89275 Elchingen
(DE).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,

CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,
SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

(88) Date of publication of the international search report:
16 June 2005

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: A PROCESS FOR THE PRODUCTION OF A NITROGENOUS LAYER ON A SEMICONDUCTOR OR METAL
SURFACE

(57) Abstract: A first process for the production of a thin nitrogenous layer on a semiconductor surface by contacting at least a part
of the surface with a nitrogenous liquid, by applying an electrical voltage between the surface, the liquid and an electrode according
to a given voltage-time curve until a layer thickness of less than 5 nm is formed, and then separating the surface from the liquid.
A second process for the production of a thin nitrogenous layer on a metal surface or on a metal layer located on a substrate by
contacting at least a part of the surface or the metal layer with a nitrogenous liquid, by applying an electrical voltage between the
surface or metal layer, the liquid and an electrode according to a given voltage-time curve until a layer thickness of less than 50 nm
is formed, and then separating the surface or the metal layer from the liquid. A third process for detaching an oxygen-containing
and/or nitrogenous layer on a semiconductor or a metal surface.



WO 2005/027215 A3